2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The No Action Alternative, Proposed Action, and other alternatives, are discussed in the following sections. A glossary of the terms, acronyms and abbreviations used in this EA, is provided in **Appendix B**.

2.1 ALTERNATIVES CONSIDERED IN DETAIL

This section addresses the No Action Alternative and the Proposed Action. Alternatives considered but eliminated from detailed analysis are discussed in **Section 2.2**.

2.1.1 No Action Alternative

Under the No Action Alternative, no upgrades or rebuilds to the existing transmission line system would be constructed in the Fort Collins area, and only essential maintenance activities would be performed. Structures and hardware would be maintained, repaired, and/or replaced as required during routine maintenance activities or in the event of emergency outages of the transmission lines. Repairs will be required with increasing frequency in the future as the transmission lines increase in age.

Implementation of the No Action Alternative would preclude most of the anticipated effects to the environment that would be associated with the Proposed Action. Minor adverse effects would result from the increasingly frequent repairs and maintenance activities. If the No Action Alternative is implemented, other actions would be required to improve the electric system that serves the Fort Collins area to provide reliable delivery of additional electric power. The other actions taken to improve the reliability of electric system in the Fort Collins area would have environmental effects.

Platte River is adding additional power generation at the Rawhide Energy Station (see **Section 1.1**) to serve the increasing demands for electricity in the Fort Collins area. The No Action Alternative, even with implementation of energy conservation measures, would not meet the delivery needs for the additional generation, and would not provide for the need for reliable delivery of the electricity to the areas of demand.

2.1.2 Proposed Action

The Proposed Action is described in this section. Platte River is proposing to make improvements to its transmission system (see **Figure 1-1**) and to rebuild and upgrade Western's lines within the existing ROWs and will be within the existing segment lengths as follows:

(1) Platte River will string a second 230kV line on the existing double-circuit single-column steel pole structures between the Rawhide Energy Station and the LaPorte Substation. This second line will not terminate at the LaPorte Substation but, instead, will bypass it and will be connected to the upgraded line section described in item (2) below. This new 230kV line from the Rawhide Energy Station will terminate at Platte River's 230kV switchyard at the Timberline Substation as described in item (4) below.

(2) Platte River will convert one side of its existing double-circuit line from the LaPorte Substation to the LaPorte Tap line to 230kV operation. This circuit will be disconnected from the LaPorte Substation and connected with the new line circuit from Rawhide Energy Station described in item (1) above.

(3) Platte River proposes to rebuild and upgrade Western's existing 115kV H-frame wood pole transmission line between the LaPorte Tap and Western's Poudre Substation to a double-circuit transmission line with single-column steel poles. One circuit is proposed to be constructed for 115kV operation and to terminate at the Poudre Substation. The second circuit will be designed and constructed for 230kV operation and will be connected at the LaPorte Tap to the line described in item (2) above. This new 230kV transmission line will bypass the Poudre Substation and connect with Platte River's existing double-circuit line to the Timberline Substation when upgraded as described in item (4) below.

(4) Platte River will construct the second circuit on its existing double-circuit line between the Timberline and the Poudre Substations and terminate the new 230kV line at the Timberline Substation.

(5) Platte River proposes to rebuild and upgrade Western's existing 115kV H-frame wood pole transmission line between Western's Poudre Substation and Platte River's Richards Lake Substation as a double-circuit line using single-column steel poles designed for 230kV operation, but initially operated at 115kV. It is possible that only one circuit would be installed initially.

Platte River's plan is to put the new steel poles at the same locations as the existing wood poles in the same ROWs. No new ROWs will be required for the Proposed Action. The Project Area is defined as the ROW of the existing transmission lines and the immediate vicinity. Disturbance activities associated with the Proposed Project will occur within the existing ROWs.

2.1.2.1 Construction Methods

The following section describes the general construction methods to be used to implement the Proposed Action. Conventional, above-ground construction methods will be used for the new structure to be built between the LaPorte Tap and the Richards Lake Tap. Only new conductor stringing is required for the line between the Rawhide Energy Station and the LaPorte Tap, and between the Poudre and Timberline Substations. Continuous access along the ROW will generally be required for the movement of construction for the new structures to be built between the LaPorte Tap and the Richards Lake Tap. Only new conductor stringing is required for the line between Rawhide Energy Station and the LaPorte Tap, and between the Poudre and Timberline Substations, vehicles and equipment within the ROW. Because the existing ROW has relatively gentle sloping terrain, the construction of additional access roads may not be required for implementation of the Proposed Project. Typical personnel and equipment required for conventional above-ground construction are provided in **Table 2-1**.

Construction of the Proposed Project will begin in Winter 2001-Spring 2002 and continue through October 2002 in the following sequential manner.

ROW Access. Cross-country travel along the ROW will be necessary between several spans in the area between the LaPorte Substation and the Rawhide Energy Station.

Surveying. The transmission line ROW will be surveyed to locate the transmission line along the centerline, determine profiles for conductor clearances, and to locate structures.

Line Removal. The portion of the existing 115kV transmission line constructed on H-frame wood poles will be removed. The poles may be cut off at ground level or pulled completely out of the ground and removed. The holes will be backfilled and the soil compacted.

TABLE 2-1
Typical Personnel and Equipment for Transmission Line Construction

Activity	Rebuild Structures Area	New Conductor Areas	Number of Persons	Equipment
Surveying	X		4	Pickup Truck
Site Preparation	X		2	Blade, Pickup Truck
Construction Yard Preparation	X		2	Blade, Pickup Truck
Structure Demolition	X		6-12	Crane, Flatbed Truck, Pickup Trucks, Tractor Trailer
Materials Hauling	X		8-12	Tractor Trailer, Crane, Flatbed Truck, Pickup Trucks
Foundation Excavation	X		4-8	Tractor with Auger, Backhoe, Pickup Trucks
Structure Assembly	X		6-12	Crane, Flatbed Truck, Pickup Trucks
Structure Erection	X		4-6	Crane (50 to 100 ton capacity), Pickup Trucks
Groundwire and Conductor Stringing	X	X	5-10	Reel Trailer, Tensioner, Puller, Digger, Winch Truck, Bucket Trucks, Pickup Trucks
Cleanup	X	X	3-6	Flatbed and Pickup Trucks
Seeding	X	X	1-2	Hydroseeder, Tractor, and Disc Plow and/or Pickup Trucks

Structure Locations. The existing structure sites will be re-used to site the new structures to the extent practicable.

Material Handling and Hauling. Construction materials will be stored at a temporary staging area. Materials will be hauled to the staging area using existing roads and streets.

Pole Installation. A truck-mounted auger will used to excavate the holes for the new poles. The new steel poles will be assembled at the pole sites or portions of the poles may be assembled at the staging areas and then hauled to the sites. Rebar cages and anchor bolt cages will be placed in the excavation holes for the steel poles. Concrete will then be used to secure these cages in place. The new steel poles will then be bolted to the anchor bolts. Excess soil will be spread evenly around the base of the poles removed from the site. Insulators and hardware will then be hung.

Conductor Stringing. The conductor pulling, sagging, and clipping operations will take place relatively quickly. Tension-string methods will be used which do not allow the conductor to touch the ground. Steel-pulling cables will be pulled down the line through large pulleys hanging from the insulator attached to each structure. These pulling cables and pulleys will pull the conductor into place under tension for the entire length of the project.

Cleanup and Restoration. Old wood poles and construction waste materials will be collected, hauled away and disposed of at approved sites. All disturbed areas not returned to agricultural cultivation will be reseeded to minimize erosion and the invasion of noxious weeds. All disturbance areas will be restored to their original condition as feasible. Damaged gates, fences, or landscaping will be repaired.

Safety Program. The contractor will be required to prepare and implement a safety program in compliance with appropriate federal, state, and local safety standards and requirements, and as approved by Western and Platte River.

Standard Construction Practices. These practices will be employed to minimize potential adverse effects during construction activities (see **Appendix F**).

2.1.2.2 Environmental Protection Measures

The environmental protection measures to be implemented during the construction activities associated with the Proposed Action are provided in the following.

Natural Environment

- New poles will be installed in approximately the same locations as the existing poles to minimize ground disturbances, except in instances where they need to be relocated to avoid sensitive resources.
- Minimize disturbance areas during installation of poles by only excavating soils in the immediate area as required for pole placement.
- Regrade disturbed areas to their original contours and reseed using native seed mixes and techniques approved by Larimer County and the City of Fort Collins.
- Avoid disturbances within areas of saturated soils.
- Silt fences will be used in the vicinity of stockpiled soil areas.
- Straw bale dikes and settling ponds for runoff will be employed as needed during construction activities to minimize potential for sedimentation of waterways.
- Avoid disturbances within floodplains and surface water by spanning such areas.

Biological Resources

- The transmission line will be constructed using raptor protection measures (APLIC 1996), which are designed to reduce the potential for avian collision, and electrocution.
- Surveys for nesting mountain plovers will be conducted in compliance with the Mountain Plover Survey Guidelines (USFWS 1999b) if transmission line upgrade activities related to the proposed project are anticipated to occur in potential habitat between April 1 and July 31.
- No "pull sites" will be located in potential plover habitat before a survey is completed and no "pull sites" will be located in or near any known nesting locations between April 1 and July 31.
- In conjunction with mountain plover surveys, biologists will look for swift fox dens in the northern portion of the Project area, beginning one month earlier than plover surveys, between March 1 and July 31. Surveys will be conducted only if project activities are planned during this period.
- Impacts to native vegetation will be minimized by the use of rubber-tired vehicles.
- Revegetation of disturbed areas will be implemented in the fall, using seed mixes, native plant species, and techniques approved by Larimer County and the City of Fort Collins, Natural Resources Department.
- Sensitive areas within the Project Area have been identified and disturbances to these areas will be avoided. Sensitive areas include wetlands and woody riparian areas, which are potential habitat for Preble's mice, Ute ladies'-tresses orchids, and Colorado butterfly plants; and upland areas that contain prairie dog colonies and potential mountain plover habitat.
- During construction activities, City of Fort Collins permits will be secured for vegetation removal. In Springer Natural Area, all individuals of American black currant shrubs will be marked and avoided.

Human Environment

- To minimize long-term land use impacts, agricultural activities will be allowed to resume within the transmission line ROW once construction activities are completed. Few or no new access roads will be required.
- Visual impacts, potential public health and safety, and EMF impacts will be minimized by the use of the existing transmission line ROWs.

Cultural Resources

- Known significant archaeological sites, historic sites, or structures within the Project Area have been identified and will be avoided.
- Monitor for subsurface cultural resources during construction.
- In the event of the discovery of unanticipated cultural material or unmarked human remains, the construction contractor will be required to cease work in the immediate vicinity of the find and take appropriate measures to protect the remains from further intentional or inadvertent disturbance.
- A qualified archaeologist will be contacted to assess any discovered remains, and the State Historic Preservation Officer will be notified within 24 hours of the discovery and preliminary assessment.

2.1.2.3 Operation and Maintenance

Operation of the transmission lines associated with the Proposed Action will be directly by system dispatches in power control centers. These dispatchers use communication facilities to operate circuit breakers that control the transfer of power through the lines. These circuit breakers operate automatically in the event of a structure or conductor failure.

Preventive maintenance for the existing and proposed transmission lines includes routine aerial and ground inspections. Aerial inspections will be conducted once per year. Ground patrols will be conducted once per year to detect equipment in need of repair or replacement. In addition, climbing inspections will be conducted on an on-going basis, with each structure being climbed and inspected at least once every five years.

Periodic maintenance activities associated both with the existing transmission lines and the Proposed Action will include repairing damaged conductors, inspection and repair of structures, and replacing damaged or broken insulators.

Undesirable vegetation will be controlled at the locations of structures and along the transmission line ROW. Due to the semiarid, urban, and agricultural nature of the Project Area, only minor and infrequent measures will be necessary to control unwanted vegetation. The use of herbicides will not normally be required within the ROW unless requested by the landowner or to reduce noxious weeds.

2.2 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Alternatives considered but eliminated from detailed analysis were conservation of energy alternatives, electric system alternatives, structure type alternatives, and design alternatives. These alternatives are discussed in this section. Routing alternatives and construction of a new transmission line were not considered for this EA because the Proposed Action upgrades and/or rebuilds of the existing transmission lines within the existing ROWs would minimize potential adverse effects compared to construction of new lines in previously undisturbed areas.

2.2.1 Conservation of Energy Alternatives

Platte River and Western encourage energy conservation through the promotion of efficient and economic uses of energy, and through the use of renewable resources, such as hydro, solar, wind, and geothermal energy sources. However, the purpose and need for the Proposed Project cannot be met by energy conservation. The purpose of the Proposed Project is to provide additional transmission for the added power generation from the Rawhide Energy Station to the Fort Collins area. Additional generation and transmission are required to meet the current and projected energy demands due to population increases in the area and to enhance the reliability of delivery for electric service. Energy conservation was not considered to be a reasonable alternative to the Proposed Project.

2.2.2 Electric System Alternatives

Electric system alternatives refer to various electrical solutions to address the electric system deficiencies associated with providing reliable service to customers. Computer software programs are used to model the power flow under various system operational modes. This allows for the consideration of using different voltages and different paths (transmission lines) to provide continuous service to customers in situations where certain system facilities may be out of service. The system improvements required at various substations for different electric system alternatives are also identified. This allows for the system costs and benefits to be analyzed to identify facility improvements that best meet the system needs for providing reliable service at the lowest cost to electric rate payers.

The Proposed Project is to be constructed to increase the capacity for load growth using both 115kV and 230kV lines as described in **Section 2.1.2**. The existing 115kV circuit alone is insufficient to serve the projected loads in the Fort Collins area. Although 345kV could be used, load growth forecasts do not justify the expensive use of higher voltage. There are no other alternative voltages that make practical sense for the Proposed Project.

2.2.3 Structure Type Alternatives

For most of the ROW of the existing transmission lines associated with the Proposed Project, there are existing double-circuit single-column steel poles. For the portion of the ROW between the LaPorte Tap and the Richards Lake Tap, the existing H-frame wood poles are to be rebuilt as double-circuit single-column steel poles capable of 230kV operation. For double-circuit transmission lines of 115kV or 230kV, double-circuit single-column steel poles are the most practical option because they require the smallest footprint (ground disturbance) and, therefore, fewer potential impacts. H-frame wood poles are not well suited for use as double-circuit. Single-column steel poles are the least intrusive design type both visually and spatially. Given the space constraint of limiting the potential disturbances associated with the Proposed Project to within the existing transmission line ROWs, only single-column steel poles are considered as an appropriate option. Typical physical design characteristics for the existing and proposed structure types are provided in **Table 2-2**.

TABLE 2-2
Transmission Line Characteristics
(Approximate Figures)

Description of Design Component	Existing Transmission Line*		Proposed Transmission Line*	
Voltage	115,000 or 115,000/115,000	230,000	115,000/115,000	115,000/230,000
ROW Width	75' – 120'	75' – 120'	75'	100'
Average Span	700'	700'	600'	600'
Maximum Span	875'	875'	760'	805'
Average Height of Structures/Range	43' – 79'	43' – 79'	85' – 105'	85' – 105'
Structure Diameter	18"	18"	18" – 24"	24" – 30"
Temporary Land Disturbed at Base	900 sq. ft.	900 sq. ft.	900 sq. ft.	900 sq. ft.
Permanent Land Disturbed at Base	36 sq. ft	36 sq. ft.	9 sq. ft.	9 sq. ft.
Minimum Ground Clearance Beneath Conductor (at maximum sag at 120 degrees F)	22'	22'	23'	23'
Maximum Height of Machinery that can be Operated Safely Under Line	15'	15'	16'	16'
Circuit Configuration	Horizontal	Horizontal	Vertical – Delta	Vertical
Conductor Size (circular mils)	336,400	954,000	954,000	954,000

* The segments of the existing and proposed transmission lines are shown on **Figure 1-1**.

2.2.4 Design Alternatives

Most of the Proposed Project does not require additional design or construction of new poles and will consist of stringing a second circuit on the existing transmission line poles. Only a portion of the Proposed Action will require the replacement of H-frame wood poles with double-circuit single-column steel poles.

The only alternative to conventional above-ground construction for the portion of the Proposed Project involving installation of new poles between the LaPorte Tap and the Richards Lake Tap is constructing the line underground. While underground construction is frequently used for lower voltage (less than 25kV) distribution lines, such construction for high voltage transmission lines has been used only occasionally in densely populated urban areas where adequate ROW is not available for overhead construction. In such situations, the costs associated with underground construction are generally offset by the costs associated with acquiring the necessary land rights for conventional overhead construction.

The placement of lower voltage electric distribution lines underground is more feasible and less costly because there are no severe problems associated with insulating each phase conductor from the others and the surrounding environment. Lower voltage lines also do not have serious problems with dissipation of the heat the conductors generate. These same considerations become much more severe with high voltage transmission lines.

One reason for the public interest in underground construction, other than visual and aesthetic reasons, is the perception that the electric and magnetic field (EMF) levels will be reduced or eliminated and, therefore, will no longer be of concern. In reality, while electric fields are eliminated, the magnetic fields can not be screened and the levels that result from different types of underground construction can vary from a few milligauss (mG) to levels higher that those associated with overhead construction. Magnetic fields associated with high voltage lines are influenced by two factors: (1) the type of underground construction; and (2) a person standing in the center of the ROW is closer to an underground line than an overhead line. Other reasons for considering underground construction include the elimination of potential impacts on bird populations from collisions with overhead ground wires, and the narrower ROW required, thus reducing certain land use impacts.

The primary disadvantages of underground transmission line construction include cost, the time and expense required to locate and repair problems if outages occur, and the recurring environmental impacts associated with maintenance activities, such as searching for and repairing problems. The cost to replace a 230kV transmission line underground is approximately three to ten times more per mile than the cost for conventional overhead construction. These estimates vary greatly depending on the type of underground construction used, and the soil and rock characteristics. If only certain sections of the transmission line were to be placed underground, large transition structures will still be needed at any point where a transition is made between overhead and underground construction. Rather than limiting construction disturbances to relatively small areas around each structure location for an overhead line, a continuous linear clear cut disturbance will be necessary if underground construction is used. This may result in increased impacts to soil, surface geology, water quality, and biological resources (including sensitive habitats that support threatened and endangered species) that could be avoided by spanning with overhead construction. The impacts to vegetation will likely be much greater due to the creation of a visual scar. Additional access roads may also be required along most of the route for construction and maintenance.

Underground transmission lines typically have a shorter service life (25-30 years) than overhead transmission lines (40-50 years). The reliability of underground and overhead transmission lines is comparable. Overhead transmission lines that are subject to weather (particularly heavy, wet snow, and icing conditions) may experience relatively frequent failures. However, these failures can generally be repaired within a relatively short period of time. Failures of underground transmission lines from dig-ins or mechanical failure (usually associated with splices) may be less frequent but can require several weeks to locate and repair.

Electric transmission lines constructed at 115kV or higher are generally designed for overhead construction, unless the capital cost differential between overhead and underground construction is funded or committed in advance by an outside party. Underground construction was not considered to be a practical alternative for the project.

2.3 COMPARISON OF ALTERNATIVES CONSIDERED IN DETAIL

The No Action Alternative would not meet the purpose and need of the project. There will be no beneficial economic impacts associated with the No Action Alternative. Long-term adverse socioeconomic impacts may occur as a result of the No Action Alternative as regional electric demands cannot be met unreliable delivery and shortages occur. In addition, if the No Action Alternative is adopted, other actions and construction activities with associated adverse environmental effects will be required to improve the electric system in the area. Ongoing maintenance activities related to the existing transmission lines would have visual and environmental effects. Repairs and maintenance will increase in frequency with age of the line.

The Proposed Action would use the existing Platte River and Western ROWs, most of which are accessible by existing roads. Due to the use of the existing ROWs and structures, minimal visual effects and environmental effects will result from construction-related activities. Generally, these effects will be limited to the six-mile section of the Western line where new structures are to be built between the LaPorte Tap and the Richards Lake Tap. There will be some temporary short-term effects to visual and biological resources during construction-related activities. The new single-column steel poles will be greater in height but will require a smaller footprint (ground disturbance area) than the existing H-frame wood poles.

There are no conservation of energy, or electric system alternatives, structure type alternatives, or design alternatives that are reasonable for this project.